

**“WORKING TOGETHER FOR AGRICULTURE”**  
**RESEARCH STATIONS ANNUAL REPORT**  
**Activities for Calendar Year 2010**



January 2011

**North Carolina Department of Agriculture  
and Consumer Services****“WORKING TOGETHER FOR AGRICULTURE”  
RESEARCH STATIONS ANNUAL REPORT  
Activities for Calendar Year 2010****Executive Summary**

Agriculture and agribusiness in North Carolina have continued to grow and diversify as a result of successful field studies at our research stations. During 2010 the outreach efforts on the research stations included 296 events with 14,095 participants, an increase in attendance of 30% over last year. More than 100 research scientists worked with technical staff on over 600 projects and provided training for 126 graduate students. Our partnerships with commodity-related groups continued to promote and support agricultural research with over \$4 million in funding to agricultural related research conducted by NC State University researchers working on research stations. Additionally, of the \$66 million in sponsored research in agriculture-based departments at the College of Agriculture and Life Sciences at NC State University, approximately \$40 million has immediate or future impacts on the projects on research stations or field laboratories. Enhanced working relationships, communications and strategic plans are improving resource utilization, management efficiency and impacts of our statewide agricultural research operations. Our state's economy benefits from increased farm income, productivity and employment.

**This annual report is provided as called for in the 2009 Strategic Plan for North Carolina Agricultural Research Stations. Its purpose is to highlight progress made toward the goals identified in the plan.**

**Goal 1: Enhance Infrastructure for High-Quality Applied Agriculture Research**Facilities

- Funding through timber receipts was approved for improvement to existing irrigation systems at the Horticultural Crops Research Station at Clinton and the Peanut Belt Research Station at Lewiston and to renovate the grain handling facilities at several research stations including the Caswell Research Farm at Kinston and the Upper Coastal Plain Research Station at Rocky Mount.
- All research stations are being evaluated to assess management of land resource assignments. Superintendents continue to develop detailed comprehensive land use systems that will include consideration of present and future use, research and extension project support, resource needs, efficiency and budget.
- Spill Prevention, Control, and Countermeasure Plans are being developed and updated for all Research Stations. The initial phase of the process is to identify, remove and replace underground storage tanks. Station superintendents received training on new plan procedures at the August Superintendent's meeting.
- A new greenhouse was constructed at the Piedmont Research Station at Salisbury to support fruit research at the North Carolina Research Campus in Kannapolis.

Staffing

- The annual superintendents' meeting in August involved training and strategy sessions to enhance research station operation and efficiency. Time was spent discussing the station budgets including impacts of projected budget shortfalls and potential options for overcoming them. Information was also presented on the importance and methods of conducting quality research and improving current safety programs. Superintendents and staff will continue participating in annual subject matter training important to conducting high-quality research covering topics such as: research project management, animal and plant care, irrigation, pest management and safety.
- Input from both NCDA&CS and NC State University has been provided for consideration in personnel evaluations. Additionally, superintendents of NCSU stations have been evaluated jointly by NCSU and NCDA&CS administration.

- All station superintendents (NCSU and NCDA&CS) will be required to attend Opening Doors Training which explores a framework that deepens diversity awareness and enhances the ability to create inclusive organizations. This workshop addresses personal and professional change as part of an understanding of different initiatives of multicultural organizational development. Five superintendents attended sessions in 2010.

## Goal 2: Ensure Efficient Research Station and Farm Management

### Improved Research Project Tracking

Research projects are initiated through the Land Resource Request System or the Animal Resource Request System with approval at several levels (superintendent, department head, division head, college administration). Changes are being made to increase efficiency of the current land use request system and to increase prior planning relating to resource use. The on-line land use request system has been revised such that research station personnel and faculty project leaders must have planning discussions prior to submitting requests for land and resources relating to a project. These changes allow summaries of projects and objectives for enhanced management and planning across all research stations.

### Research Project Summary

- NC State University and NC A& T State University faculty conducting research – **105**
- USDA researchers conducting research on NC research stations - **9**
- NC State University Research Projects – **632**
- Graduate Students conducting research on research stations
  - Animal Science 14
  - Crop Science 48
  - Entomology 18
  - Horticultural Science 16
  - Plant Pathology 12
  - Soil Science 10
  - Poultry Science 8
  - Total Students 126**

### Research Highlights

#### NC State University

- Sentinel plots for early detection of Asiatic soybean rust located at 14 research stations provided information to soybean growers and minimized the use of fungicides for management of this disease, resulting in annual savings of more than \$18 million.
- Over half of the tomatoes grown in North Carolina are varieties developed at NC research stations. These varieties provide improved yields of high-quality fruit adapted to marketing needs of NC growers and our \$35 million tomato industry.
- Covington, a new sweetpotato variety developed and released by NC State University, is grown on over 85% of the sweetpotato acreage in NC resulting in a \$175 million sweetpotato industry.
- Widespread adoption of Bt cottons and resulting lower insecticide use led to stink bugs becoming the number one economic pest on NC cotton. Field research has developed a threshold, based on susceptibility to boll damage, that saves cotton producers up to \$34 per acre.



- Approximately 90% of blueberries grown for the \$51 million blueberry industry in NC are harvested from adapted varieties developed at our research stations.
- Management of intermittent heating of incubating chicken eggs can lower metabolic rates, improve heat loss, decrease stress, and affect muscle and fat tissues at market age. These developments resulting from projects conducted on NC research stations could represent a \$45 million annual benefit to the NC poultry industry.
- Current field evaluations of perennial grasses, cold hardy sugar canes and giant reeds as bioenergy crops on research stations across NC will support new economic development and the sustainable bioenergy industry statewide.



## NC A&T State University

- Evaluation of alternative swine rations and feed ingredients help to: reduce the cost of hog feed by up to a third, address increasing public concerns about the routine use of antibiotics as growth promoters, and reduce odor-causing compounds in animal waste.



- A new venture for limited-resource farmers has been shiitake mushroom cultivation outdoors on logs for seasonal production. More recently, study of indoor growing practices shows higher yields in year round production.
- Workshops and field days have been conducted for small farm production including: pastured poultry; no-till vegetable production; hot pepper production for crop diversification; plant micro propagation using household products; high tunnel vegetable production; genetic models for producing upscale pork; specialty mushroom cultivation; aquaculture in a recirculation system; a meat goat demonstration; cut flower production; Asian vegetable production; production of seedless watermelons; plasticulture and drip irrigation.
- Researchers are exploring strategies for improving the intestinal integrity to enhance food safety and health in poultry. Methods being employed include administration of mushroom extract for Bifidobacteria enhancement and Salmonella reduction, and utilizing fungus mycelated grain for molt induction and performance in commercial laying hens.
- Researchers in animal sciences and agricultural engineering are working to convert swine manure into bio-oil, while others compare aerated marsh-pond –marsh and marsh systems for treating swine wastewater.

### Resource Utilization

A number of actions have occurred or are in process across the research stations system that will result in more efficient and successful research management.

- NCDA&CS has established a receipt-supported forester position within the Research Stations Division to oversee the sustainable management of timberlands. A comprehensive management plan, including a minimum of a 5-year harvest schedule, will be completed by June 30, 2011.
- The Mountain Organic Research and Extension Unit, an area dedicated to organic production systems research, is being developed at the Mountain Research Station in Waynesville.
- A master plan is being developed at the Mountain Horticultural Research Station to identify additional land that can be used for research. This plan will include a detailed topographic map showing locations for research areas, access roads and irrigation systems that will allow efficient use of resources for conducting research. A more stringent crop rotation system was implemented to enhance research capabilities.
- Ongoing reviews of all research station facilities and equipment that support various research program areas (i.e. tobacco, beef, horticultural crops, etc.) have increased resource sharing among research stations.



- An area dedicated to organic production systems has been identified at the Caswell Research Farm in Kinston.
- An area at Upper Piedmont Research Station in Reidsville is being developed to support new research on goats. These resources will be used by a faculty member from NC A&T State University.
- NCSU faculty members with beef responsibilities are developing a futuristic plan for beef research, extension and teaching. Collaboration between Upper Piedmont Research Station, Butner Beef Laboratory, Umstead Farm, and other research stations will be critical in fulfilling this new plan.
- Consideration was given to operate the Williamsdale Farm Extension and Research Center Field Laboratory via the Horticultural Crop Research Station at Clinton. However, at this time this field laboratory is most efficient as a stand-alone unit that collaborates with other research stations/field laboratories.
- Field sites at the research stations in Kinston are being evaluated for inclusion in the new NCSU AMPLIFY (Agrosphere Modeling for Producing Large Increases in Food Yield) Research Program.

### 2010 Grant Funding (Some specific examples of recent grant funding are shown below.)

NC commodity-related groups provided over \$4 million in support of research projects by NC State University faculty. Much of this research was conducted on research stations across North Carolina. Approximately \$40 million in sponsored research through the College of Agriculture and Life Sciences at NC State University has immediate or future impacts on the projects on research stations or field laboratories.

Dr. Donald McDowell, Interim Dean, School of Agriculture and Environmental Sciences, said that NC A&T research faculty received \$21 million in external grants last year. (Source: *On the Move newsletter*, October 2010, Vol. IX, No. 5, "Dr. Mac's Moment", <http://www.ag.ncat.edu/onthemove/index.html>)



#### USDA

- \$3.2 million grant was awarded to help develop broccoli varieties suitable for production in the eastern U.S., to recruit farmers and to organize grower networks. The project is designed to develop a regional year-round source of broccoli for consumers
- \$1.2 million grant was awarded to the Crop Science Department at NC State University to develop corn, soybean, peanut and wheat varieties with traits necessary for organic production.
- \$45,000 Specialty Crops Block grant was awarded to support organic production research in the mountains of North Carolina.

#### Kellogg Foundation

- \$3.15 million endowment to support two endowed chair positions, one at NC State University and one at NC A&T State University, in support of the Center for Environmental Farming Systems (CEFS).

#### Tobacco Trust Fund Commission

- \$150,000 to NCDA&CS to support the continuation of caneberry management at the following stations: Mountain Horticultural Crops, Oxford, Sandhills, Upper Mountain and Upper Piedmont.
- \$65,040 to NCDA&CS to support the continuation of strawberry research to expand the current NC market. The majority of the research is being conducted at the Piedmont and Upper Mountain Research Stations.

#### Golden LEAF Foundation

- \$200,000 grant to connect researchers at NC State University, chefs and nutritionists with Johnson and Wales University, growers and consumers in an effort to create a new and better North Carolina strawberry.

#### Sustainable Agriculture Research and Education (SARE)

- \$250,000 grant was awarded to the Animal Science Department at NC State University to support research and education of organic dairy production in the South.



### **Goal 3: Enhance Working Relationships and Communication**

- A Memorandum of Understanding (MOU) was signed by Commissioner Steve Troxler, NC Department of Agriculture and Consumer Services and Dr. Donald McDowell, Interim Dean of the School of Agriculture and Environmental Sciences at NC A&T State University, on December 11, 2009 to provide guidance and clarity as to the roles of both agencies, individually and cooperatively, in the operation and use of the agricultural research stations across North Carolina. This is the first MOU between these two agencies.
- A new MOU was signed on December 16, 2009, by Commissioner Steve Troxler and Dr. Johnny Wynne, Dean of the College of Agriculture and Life Sciences at NC State University to replace the original MOU signed in 1938. The purpose of the MOU is to provide guidance and clarity as to the roles of both agencies, individually and cooperatively, in the operation and management of the agricultural research stations across North Carolina
- A new steep slope viticulture project with Appalachian State University was initiated during 2009 at the Upper Mountain Research Station in Laurel Springs. The purpose of this ongoing project is to evaluate grape varieties and production methods suitable to production on mountain slopes and to monitor runoff impacts on soil and water.

- In early 2010, a demonstration and applied research project involving small ruminant animals and focusing on reproduction, parasite management and forage production was initiated with NC A&T State University faculty to be located at the Upper Piedmont Research Station at Reidsville and the Upper Mountain Research Station at Laurel Springs.
- Involvement of NC A&T State University faculty has expanded at the Center for Environmental Farming Systems (CEFS) in Goldsboro. CEFS is a cooperative effort between NCDA&CS, NC State University and NC A&T State University.
- MOU's with the Forest Management Technology Program at Wayne Community College and Natural Resource Management Program at Haywood Community College have been developed to allow use of research stations for teaching and for sharing of information collected from the research stations as part of the teaching opportunity.
- NCSU staff located at the North Carolina Research Campus at Kannapolis are utilizing resources including staff, facilities and land at the Piedmont Research Station to support ongoing research related to food nutrition.

#### Appropriated Funding

Meetings of administrative representatives (NCSU and NCDA&CS) on budget have been held at least monthly since July 1, 2010. Additionally, a research station budget committee was established to provide recommendations on additional sources of budget support. This committee is made up of faculty (NCSU), superintendents (NCSU, NCDA&CS) and administrative personnel (NCSU, NCDA&CS). Three committee meetings have occurred. Additional input from superintendents and faculty have occurred via meetings, telephone calls and email.

### **Goal 4: Strengthen Outreach, Extension and Education**

#### Research Station Outreach

To expand outreach programs, the Research Stations Division developed and launched an on-line event report to allow tracking and evaluation of station events. From January-December of 2010, there were 296 events attended by 14,095 individuals. The table below provides a breakdown of the attendance and events conducted at the research stations and the NC A&T Research Farm.

<b>Event Type</b>	<b>No. of Events</b>	<b>No. of Participants</b>
Field Days	17	3533
Workshops/Training	72	2159
Education	36	1070
Tour	87	2367
Youth	57	3447
Other*	27	1519

*\*Events and meetings related to station activities that included an opportunity to share information*

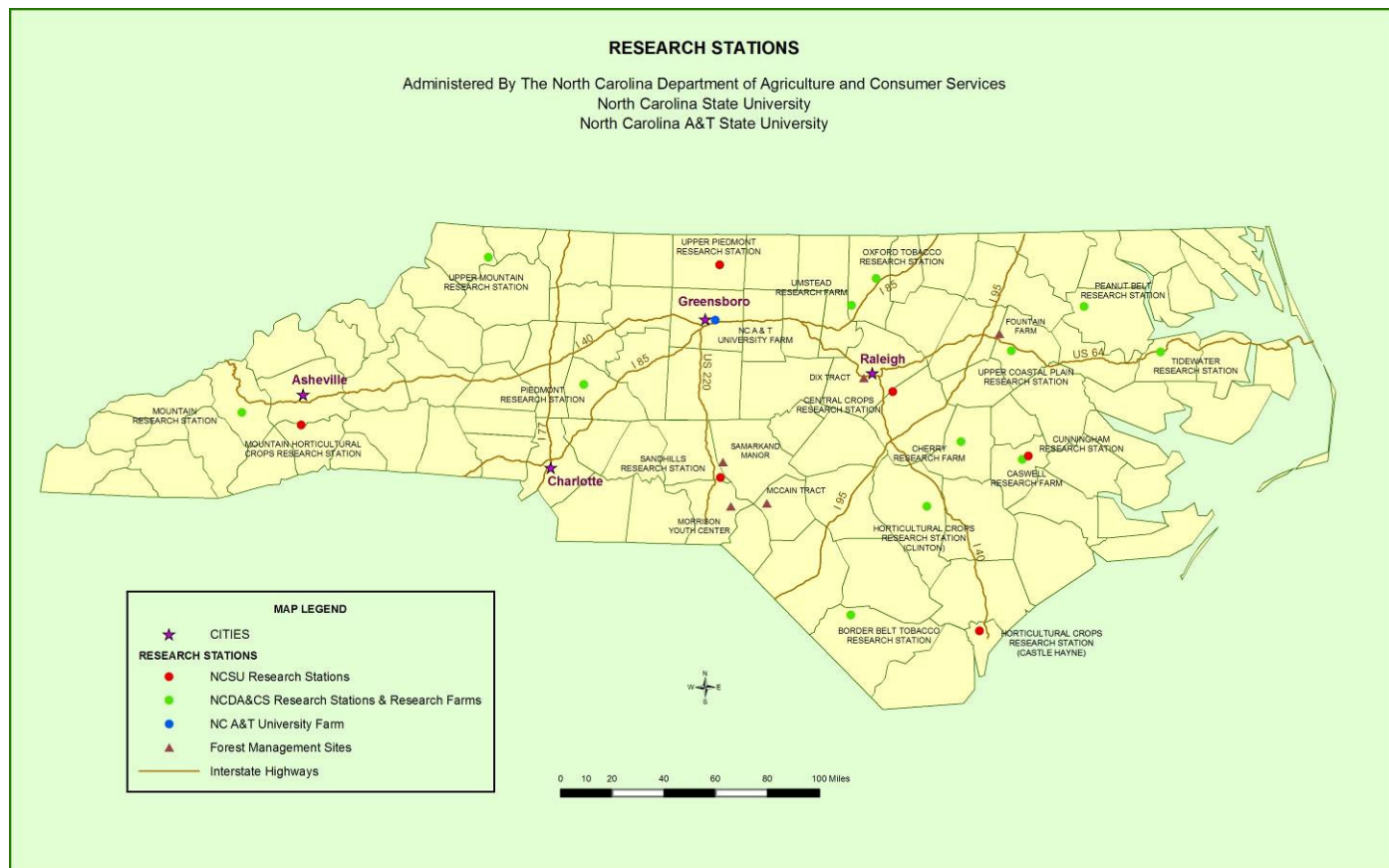




## Educational Work Opportunities

The research stations frequently hire temporary employees throughout the year specifically during harvesting season to insure that projects are completed in a timely manner. Many of these employees are students from local high schools, community colleges or universities. The students receive hands-on experience, not only in agriculture, but implementation, management and collection of data for research projects. From January-December 2010, the Research Stations employed and trained 41 students as listed below.

- High School Students 11
- College Students 20
- Interns 10



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